[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2012-0002; Directorate Identifier 2011-NE-42-AD]

RIN 2120-AA64

Airworthiness Directives; Continental Motors, Inc. Reciprocating Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: We propose to adopt a new airworthiness directive (AD) for certain Airmotive Engineering Corp. replacement parts manufacturer approval (PMA) cylinder assemblies marketed by Engine Components International Division (ECi), used on the Continental Motors, Inc. (CMI) models 520 and 550 reciprocating engines, and all other engine models approved for the use of CMI models 520 and 550 cylinder assemblies such as the CMI model 470 when modified by supplemental type certificate (STC). This proposed AD was prompted by failure reports of multiple cylinder head-to-barrel separations and cracked and leaking aluminum cylinder heads. This proposed AD would require initial and repetitive inspections, replacement of cracked cylinders, and replacement of cylinder assemblies at reduced times-in-service. This proposed AD would also prohibit the installation of affected cylinder assemblies into any engine. We are proposing this AD to prevent cylinder head cracks, engine failure, and loss of the airplane.

DATES: We must receive comments on this proposed AD by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

• Federal eRulemaking Portal: Go to http://www.regulations.gov. Follow the instructions for submitting comments.

• Fax: 202-493-2251.

• Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

• Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For certain service information identified in this proposed AD, contact Continental Motors, Inc., PO Box 90, Mobile, AL 36601; phone: 251-438-3411, Internet: http://tcmlink.com/servicebulletins.cfm. For certain other service information identified in this proposed AD, contact Engine Components International Division, 9503 Middlex Drive, San Antonio, TX 78217; phone 210-820-8101; Internet: http//www.eci.aero/pages/tech_svcpubs.aspx. You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Examining the AD Docket

You may examine the AD docket on the Internet at http://www.regulations.gov; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Office (phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Jurgen E. Priester, Aerospace Engineer, Special Certification Office, FAA, Rotorcraft Directorate, 2601 Meacham Blvd., Fort Worth, TX 76137; phone: 817-222-5159; fax: 817-222-5785; email: jurgen.e.priester@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under the ADDRESSES section. Include "Docket No. FAA-2012-0002; Directorate Identifier 2011-NE-42-AD" at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed AD because of those comments.

We will post all comments we receive, without change, to http://www.regulations.gov, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.

Discussion

We received multiple failure reports of Airmotive Engineering Corp. PMA cylinder assemblies, part number (P/N) AEC631397, ECi Class 71 and Class 76, installed on certain CMI models IO-520, TSIO-520, IO-550, and IOF-550 reciprocating engines and other engines approved for the use of CMI models 520 and 550 cylinder assemblies such as the CMI model 470 when modified by STC. ECi part numbering includes four Classes of P/N AEC631397 cylinder assemblies based upon their intended use. Only Classes 71 and 76 are affected; Classes 68 and 70 are not affected. The Class number appears in the ECi P/N cylinder marking immediately following AEC631397. These markings are found on the bottom flange of the cylinder. We identified two independent failure modes resulting in the cylinder head separations; however, the exact root cause of each failure mode could not be definitively identified. One failure mode is cracking that initiates in the internal dome radius of the cylinder head and the second is cracking at the

cylinder head-to-barrel threads. The affected cylinder assemblies are separated into two manufacturing groups that would require the actions in this proposed AD. Those two groups are defined by serial number (S/N) ranges. One group consists of cylinder assemblies with S/N 1 through S/N 33696. The second group consists of cylinder assemblies with S/N 33697 through S/N 61176. The unsafe condition, if not corrected, could result in cylinder head cracks, engine failure, and loss of the airplane.

Airmotive Engineering Corp. held a meeting, which we attended, on December 11, 2012, to discuss certain active PMA projects. Also on their agenda was a briefing to us on their meeting with the National Transportation Safety Board (NTSB) regarding the subject of this proposed AD. Although that briefing was not intentioned by us, because it occurred, we are placing a summary and a copy of what they provided for our consideration, into the AD docket for public review.

Airmotive Engineering Corp. held another meeting, with us and the NTSB in attendance, on February 14, 2013. The purpose of the meeting was to further discuss the causes of their cylinder failures and what they have done to address these failures. We are placing all of the information from this meeting in the AD docket for public review.

Knowing the likely impact that compliance with the AD will have upon the owners and operators, a detailed review was performed to consider all aspects of the information provided by Airmotive Engineering Corp. After considering all factors, which included, for example, the efforts of two Chief Scientific and Technical Advisors, data from the FAA/Airmotive Engineering Corp. meetings, and the application of the FAA Policy Statement on Risk Assessment for Reciprocating Engine Airworthiness Directives (PS-ANE100-1999-00006), we concluded that proceeding with this proposed AD to correct the unsafe condition was appropriate.

Relevant Service Information

We reviewed Continental Motors, Inc. Service Bulletin (SB) No. SB96-12, dated September 10, 1996. Part 1 Section C of the SB describes procedures for leak checking cylinder assemblies. We also reviewed ECi Service Instruction No. 99-8-1, Revision 9, dated February 23, 2009, Sections 4.3, 4.4, 6.1, and 6.2, which provide information on cylinder identification and part numbering.

FAA's Determination

We are proposing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

Proposed AD Requirements

This proposed AD divides ECi cylinder assemblies, P/N AEC631397, Class 71 and Class 76, into two groups; Group A cylinder assemblies and Group B cylinder assemblies. Group A cylinder assemblies are those cylinder assemblies with S/N 1 through S/N 33696. Group B cylinder assemblies are those cylinder assemblies with S/N 33697 through S/N 61176. This proposed AD would require removing Group A cylinder assemblies from service within 25 operating hours if, on the effective date of the AD, the cylinder operating hours are fewer than 500 hours, or more than 1,000 hours. This proposed AD would also require removing Group B cylinder assemblies from service within 25 operating hours if, on the effective date of the AD, the cylinder operating hours are 1,000 or more.

This proposed AD would also require repetitive visual inspections, compression tests, and leak checks for cracks, for Group A cylinder assemblies with between 500 and 1,000 operating hours, and for Group B cylinder assemblies with fewer than 1,000 operating hours, until they are removed from service.

Finally, this proposed AD would also prohibit installing affected ECi cylinder assemblies onto any engine and would require reporting to the FAA all removed cylinder assemblies.

Costs of Compliance

We estimate that this proposed AD would affect about 6,000 Continental Motors, Inc. models IO-520, TSIO-520, IO-550, and IOF-550 reciprocating engines and all other engine models approved for the use of CMI models 520 and 550 cylinder assemblies (such as the CMI model 470 when modified by STC), installed on airplanes of U.S. registry. We also estimate that each affected ECi cylinder will be inspected on average four times in the first year. We also estimate that about six hours per engine would be required to perform the visual inspection, compression test, and leak check. The average labor rate is $85 per hour. Finally, we estimate that about 18 hours would be required to replace all six cylinder assemblies during scheduled overhaul maintenance, and that a replacement cylinder assembly would cost about $1,700. Based on these figures, we estimate the total cost of this proposed AD to U.S. operators to change all ECi cylinders to be $82,620,000. Our cost estimate is exclusive of possible warranty coverage.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority

because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

We determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

(1) Is not a "significant regulatory action" under Executive Order 12866,

(2) Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),

(3) Will not affect intrastate aviation in Alaska to the extent that it justifies making a regulatory distinction, and

(4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

Continental Motors, Inc. (formerly Teledyne Continental Motors, Inc., formerly Continental): Docket No. FAA-2012-0002; Directorate Identifier 2011-NE-42-AD.

(a) Comments Due Date

We must receive comments by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to the following Continental Motors, Inc. (CMI) models 520 and 550 reciprocating engines, and all other engine models approved for the use of CMI models 520 and 550 cylinder assemblies such as the CMI model 470 when modified by supplemental type certificate (STC), with Airmotive Engineering Corp. replacement parts manufacturer approval (PMA) cylinder assemblies, marketed by Engine Components International Division (hereinafter referred to as ECi), part number (P/N) AEC631397, with ECi Class 71 or Class 76, serial number (S/N) 1 through S/N 33696, or S/N 33697 through S/N 61176, installed on, but not limited to:

(1) IO-520-A, -B, -BA, -BB, -C, -CB, -D, -E, -F, -J, -K, -L, -M, -MB, -N, -NB, and LIO-520-P.

(2) TSIO-520-A, -AE, -AF, -B, -BB, -BE, -C, -CE, -D, -DB, -E, -EB, -G, -H, -J, -JB, -K, -KB, -L, -LB, -M, -N, -NB, -P, -R, -T, -U, -UB, -VB, -WB, and LTSIO-520-AE.

(3) IO-550-A, -B, -C, -D, -E, -F, and -L.

(4) IOF-550-B, -C, -D, -E, -F, and -L.

(5) Other engines using CMI models 520 and 550 cylinder assemblies, such as the CMI model 470 when modified by STC.

(d) Unsafe Condition

This AD was prompted by reports of multiple cylinder head-to-barrel separations and cracked and leaking aluminum cylinder heads. We are issuing this AD to prevent cylinder head cracks, engine failure, and loss of the airplane.

(e) Compliance

Comply with this AD within the compliance times specified, unless already done.

(1) Review the engine maintenance records to determine if any affected cylinders were installed at the time of engine overhaul or during any other maintenance event, or were installed when the engine was modified and are currently installed.

(2) If you do not have any of the affected ECi cylinders installed on your engine, no further action is required.

(f) Cylinder Identification and Serial Number Location

(1) Check the cylinder assembly P/N and Class number. The ECi cylinder assembly, P/N AEC631397, Class 71 or Class 76, is stamped on the bottom flange of the cylinder barrel. Guidance on the P/N and Class number description and location can be found in ECi Service Instruction No. 99-8-1, Revision 9, dated February 23, 2009.

(2) For ECi cylinder assemblies, P/N AEC631397, manufactured through 2008, find the cylinder assembly S/N stamped on the intake port boss two inches down from the top edge of the head.

(3) For ECi cylinder assemblies, P/N AEC631397, manufactured on or after January 1, 2009, find the cylinder assembly S/N stamped just below the top edge of the head on the exhaust port side.

(4) If you cannot see the cylinder assembly P/N when the cylinder assembly is installed on the engine, an alternative method of identification may be used as follows:

(i) Remove the cylinder rocker box cover.

(ii) Find the letters ECi, cast into the cylinder head between the valve stems.

(iii) Check the cylinder head casting P/N. Affected cylinder assemblies have the cylinder head casting P/N, AEC65385, cast into the cylinder head between the valve stems.

(iv) Find the cylinder assembly S/N as specified in paragraph (f)(2) or (f)(3) of this AD as applicable.

(g) Removal From Service

(1) For those Group A cylinder assemblies, P/N AEC631397, ECi Class 71 or 76, S/N 1 through S/N 33696, with fewer than 500 operating hours time-in-service (TIS) or with more than 1,000 operating hours TIS on the effective date of this AD, remove the cylinder assemblies from service within the next 25 operating hours TIS.

(2) For those Group B cylinder assemblies, P/N AEC631397, ECi Class 71 or 76, S/N 33697 through S/N 61176, with more than 1,000 operating hours TIS on the effective date of this AD, remove the cylinder assemblies from service within the next 25 operating hours TIS.

(h) Inspection of Group A Cylinder Assemblies with Between 500 and 1,000 Operating Hours TIS and Group B Cylinder Assemblies with Fewer Than 1,000 Operating Hours TIS

(1) Within the next 10 operating hours TIS after the effective date of this AD, visually inspect, compression test, and leak check the Group A cylinder assemblies with between 500 and 1,000 operating hours TIS, and Group B cylinder assemblies with fewer than 1,000 operating hours TIS. Use paragraphs (h)(2) through (h)(5) of this AD to do the inspection, test, and leak check.

(2) Visually inspect the exterior of each cylinder head and barrel interface around the perimeter of the cylinder as follows:

(i) Before any engine cleaning, with good lighting, look for signs of white or black combustion products between cooling fins, especially on the exhaust valve side of the cylinder assembly.

(ii) Remove the cylinder from service if you find any indication of a crack or black combustion products on the side of a cylinder.

(iii) The presence of oil or a normal dirty appearance may not indicate a head crack.

(3) Perform a standard differential compression test to the cylinder assembly. If the cylinder assembly has a pressure reading of less than 55/80 pounds per square inch gauge pressure, on the differential pressure test gauges, remove the cylinder assembly from service.

(4) Use Part 1 Section C "Leak Check" of Teledyne Continental Motors Service Bulletin (SB) No. SB96-12, dated September 10, 1996, to perform the leak checks required by this AD.

(5) Remove from service any cylinder assembly found cracked and/or leaking.

(6) Repeat paragraphs (h)(2) though (h)(5) of this AD within every 50 operating hours TIS since last inspection. Remove from service any cylinder assembly before accumulating 1,000 operating hours TIS.

(i) Installation Prohibitions

After the effective date of this AD:

(1) Do not repair, or reinstall onto any engine, any cylinder assembly removed per this AD.

(2) Do not install any ECi cylinder assemblies, P/N AEC631397, ECi Class 71 or 76, with the S/Ns listed in paragraph (c) of this AD, onto any engine.

(3) Do not install any engine having one or more ECi cylinder assemblies, P/N AEC631397, ECi Class 71 or 76, with the S/Ns listed in paragraph (c) of this AD, into any aircraft.

(4) Do not return to service any aircraft that has an engine with an ECi cylinder assembly subject to this AD, if the cylinder assembly has 1,000 or more operating hours TIS.

(j) Alternative Methods of Compliance (AMOCs)

The Manager, Special Certification Office, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request.

(k) Reporting Requirements

Report to the FAA all cylinder assemblies that you removed per this AD. Send your report to the Special Certification Office, FAA, Rotorcraft Directorate, Attn: Jurgen E. Priester, Aerospace Engineer, 2601 Meacham Blvd., Fort Worth, TX 76137; phone: 817-222-5159; fax: 817-222-5785; email: 9-ASW-190-COS@faa.gov. Include the following information:

(1) Aircraft model.

(2) Continental Motors, Inc. engine model number.

(3) ECi cylinder assembly S/N.

(4) Cylinder assembly total operating hours.

(5) Installation date of ECi cylinder assembly.

(6) Airplane utilization average per year (flight hours per year).

(7) Number of flight hours since last mandatory inspection required by this AD.

(8) Reason for cylinder removal, i.e., leaking head with cracks or other indications found, failed compression test, valves or rings leaking, or a head separation.

(9) How the defect was found, i.e., visual inspection, leak check, compression test, etc.

(10) Source of leak(s).

(11) Location of crack(s). Locate by counting the number of cooling fins up from the head/barrel interface.

(12) Length of crack(s).

(13) Location of separation. Locate by counting the number of cooling fins up from the head/barrel interface.

(14) Your contact information (optional).

(l) Paperwork Reduction Act Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2120-0056. Public reporting for this collection of information is estimated to be approximately 5 minutes per response, including the time for reviewing instructions, completing and reviewing the collection of information. All responses to this collection of information are mandatory. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, AES-200.

(m) Related Information

(1) For more information about this AD, contact Jurgen E. Priester, Aerospace Engineer, Special Certification Office, FAA, Rotorcraft Directorate, 2601 Meacham Blvd., Fort Worth, TX 76193; phone: 817-222-5159; fax: 817-222-5785; email: jurgen.e.priester@faa.gov.

(2) For ECi Service Instruction No. 99-8-1, Revision 9, dated February 23, 2009, which is not incorporated by reference in this AD, contact Engine Components

International Division, 9503 Middlex Drive, San Antonio, TX 78217; phone 210-820-8101; Internet: http//www.eci.aero/pages/tech_svcpubs.aspx.

(3) For other service information referenced in this AD, contact Continental Motors, Inc., PO Box 90, Mobile, AL 36601; phone: 251-438-3411, Internet: http://tcmlink.com/servicebulletins.cfm.

(4) You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

Issued in Burlington, Massachusetts, on August 5, 2013.

Colleen M. D'Alessandro,
Assistant Manager, Engine & Propeller Directorate,
Aircraft Certification Service.

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